CLAIMS

1. An optical frequency comb generator comprising:

oscillation means for oscillating a modulating signal of a preset frequency;

resonator means composed of a light incident side reflecting mirror and a light exiting side reflecting mirror, parallel to said light incident side reflecting mirror, and configured for propagating light incident via said light incident side reflecting mirror in the outward path direction or in the backward path direction for causing the resonant state of the incident light; and

optical modulating means arranged between said light incident side reflecting mirror and the light exiting side reflecting mirror, for phase-modulating the light resonant in said resonator means, responsive to said modulating signal supplied from said oscillation means, for generating a plurality of sidebands spaced apart from one another by an interval corresponding to the frequency of said modulating signals, with the frequency of the incident light as center;

said optical modulating means phase-modulating the light propagated in said outward path direction or in said backward path direction; said optical modulating means being a waveguide path for propagating the light thereon.

2. The optical frequency comb generator according to claim 1 wherein said light incident side reflecting mirror and/or the light exiting side reflecting mirror is a reflecting film formed on a light incident side end face and/or a light exiting side end face of said optical modulating means.

3. The optical frequency comb generator according to claim 1 further comprising:

an electrode arranged parallel to said light modulation means for propagating said modulating signal oscillated from said oscillation means in the outward direction or in the backward direction; said light modulation means phase-modulating the light propagated in said outward direction or in the backward direction in dependence upon said modulating signal propagated through said electrode in the outward direction or in the backward direction.

4. The optical frequency comb generator according to claim 3 further comprising:

a reflector and a phase shifter, provided on one end of said electrode; said reflector reflecting the modulating signal supplied from the opposite end of said electrode; said phase shifter adjusting the phase of the reflected modulating signal.

5. The optical frequency comb generator according to claim 4 wherein said phase shifter adjusts the phase of said reflected modulating signal in dependence upon the shape of said electrode, frequency of said modulating signal and the group refractive index of said waveguide path.

6. The optical frequency comb generator according to claim 3 wherein one end of said electrode is provided with a cut point or a shorting point for reflecting the modulating signal supplied from the opposite end thereof.

7. The optical frequency comb generator according to claim 5 wherein said cut point or the shorting point in said electrode is adjusted in dependence upon the frequency of said modulating signal, phase shift at the time of reflection or the

group refractive index of said waveguide path.

8. An optical resonator comprising oscillation means for oscillating a modulating signal of a preset frequency, light propagating means for propagating the light incident on one end face thereof in the outward path direction or in the backward path direction, and optical modulating means arranged between said end faces for modulating the phase of the propagated light in dependence upon said modulating signal supplied from said oscillation means; said optical modulating means modulating the light propagated in said outward path direction or in the backward path direction.

9. An optical modulator comprising:

separating means for separating the incident light depending on the directions of polarization, polarized light control means for controlling the direction of polarization of light components obtained on separation to the same direction, oscillation means for oscillating a modulating signal of a preset frequency, light propagating means for propagating the light incident on one end face thereof in the outward path direction or in the backward path direction, and optical modulating means arranged between said end faces for phase-modulating the propagated light in dependence upon said modulating signal supplied from said oscillating means; said optical modulating means modulating the light propagated in said outward path direction or the light propagated in said backward direction.

10. The optical modulator according to claim 9 wherein said light propagating

means is a crystal device within which light is propagated as said light undergoes total reflection therein.

11. An optical modulator comprising:

separating means for separating the incident light depending on the directions of polarization, polarized light control means for controlling the direction of polarization of light components obtained on separation, to the same direction of polarization, oscillation means for oscillating a modulating signal of a preset frequency, resonator means made up of reflecting mirrors placed parallel to each other, and configured for propagating light incident at respective different angles from said polarization control means via one of said reflecting mirrors in the outward path direction or in the backward path direction for causing the resonant state, and optical modulating means for phase-modulating the light caused to be resonant in said resonance means, responsive to said modulating signal supplied for said oscillation means.

12. The optical modulator according to claim 11 wherein said separating means in the optical modulator is formed of a birefringent material.